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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/091,050	03/05/2002	Michael Kaus	DE010063	6458

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EXAMINER

KRONENTHAL, CRAIG W

ART UNIT PAPER NUMBER

2624

DATE MAILED: 04/05/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/091,050

Applicant(s)

KAUS ET AL.

Examiner

Craig W. Kronenthal

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 26 January 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-6 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-6 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 05 March 2002 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection.

Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114.

Applicant's submission filed on December 16, 2005 has been entered.

2. The objections to the claims have been withdrawn in view of the amendment.

3. The amendment to the specification has been entered.

Response to Arguments

4. Applicant's arguments filed with respect to claim 1 have been fully considered but they are not persuasive. Applicant argues in essence that O'Donnell does not describe searching along a search line, which traverses the mesh and extends in the image. The examiner disagrees and indicates that the search line (uncertainty line Figure 13, 36) extends in the image plane (the image plane being the same as the sheet of paper the figure is drawn on) and traverses the mesh. Looking at Figure 13, the points (32) P_i , P_{i+1} , P_{i+2} , and P_{i-1} are in the same plane as the image plane. These points (32) are connected by line segments (34) representing the mesh's intersection with the image plane (col. 12 lines 37-49). The search line (36) is then described as being perpendicular to the

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line segments (34) and therefore in the same plane as the image (col. 12 lines 56-58). The search line (36) is then moved in steps along the segments thereby traversing the mesh (col. 12 lines 60-63). The path of lowest energy between nodes/pixels is the path of the search line's traversal of the mesh.

Claim Rejections - 35 USC § 112

5. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 1, 5, and 6 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. In step b, it is unclear whether the search line lies (extends) in the image plane or normal to the image plane. The confusion originates from the lack of defining the normal (n) in the claim. There is no antecedent basis for this normal. While the definition of a normal line is well known, it is required that a reference be provided for the normal. For example, a line in the direction normal to a plane in the X and Y dimensions is in the Z direction. Without knowing the plane is XY, it is not possible to know that the normal is in the Z direction.

Claim Rejections - 35 USC § 102

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

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A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

7. Claims 1-6 are rejected under 35 U.S.C. 102(e) as being anticipated by O'Donnell et al. (PN 6,201,543). (hereinafter O'Donnell)

Regarding Claim 1: O'Donnell discloses a method of segmenting a three-dimensional structure, which is contained in an object, from at least one two-dimensional image (I.sub.1, I.sub.2) [image planes, col. 7 line 9, An image plane is a two-dimensional image] which represents a slice of the object, the method utilizing a deformable model (M) [hybrid model, col. 5 line 65 – col. 6 line 1] whose surface is formed by a network of meshes which interconnect network points on the surface of the model [the meshes are the position of the points on the surface of the object, which are identified in block 104 of Fig. 2, (col. 7 lines 2-3)], and which method includes the steps of:

a) Determining the meshes (T.sub.3, T.sub.4) which intersect the image (I.sub.1, I.sub.2). [The determined meshes are the result of intersecting the initial model image, which contains all the identified meshes (104), and the image planes (Fig. 3, 111) (col. 7 lines 8-10).]

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b) Searching, for each mesh determined in the step a) (Fig. 3, output of 111), a respective structure point ($x_{sub.is}$), situated on the surface of the structure, along a search line ($n_{sub.i}$) which traverses the mesh and extends along a line n_i which extends in the image plane I and whose direction corresponds to the direction of the projection of the normal n on the image plane I . [The result of the intersection (output of 111) is a set of starting points (col. 7 lines 10-11), which represent the structure points ($x_{sub.is}$) situated on the surface of the structure. The search line (uncertainty line, Figure 13, item 36) extends in the image plane (the image plane being the same as the sheet of paper the figure is drawn on) and traverses the mesh. The search line (36) is described as being perpendicular to the line segments (34) and therefore in the same plane as the image (col. 12 lines 56-58). The search line (36) is then moved in steps along the segments thereby traversing the mesh (col. 12 lines 60-63). The path of lowest energy between nodes/pixels is the path of the search line's traversal of the mesh.]

c) Calculating anew the network points ($x_{sub.im}$) of the model (M) on the basis of the structure points ($x_{sub.is}$) found. [The newly calculated network points (Fig. 3, output of 114) are those pixels/nodes along the path of lowest energy. These pixels/nodes are calculated on the basis of the input starting points (output of 111).]

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d) Repeating the steps a) to c) a number of times on the basis of the newly calculated network points. [The steps are repeated until all pixels/nodes are explored. Decision block 116 (Fig. 3) decides whether or not there are more network points to be searched (col. 7 lines 13-15). If so, the procedure returns to block (114), which again searches for the lowest energy path, taking into consideration the new network points.]

The arguments of claim 1 are applicable to claims 5 and 6. With regards to claim 5, it is inherent that the model and two-dimensional image be received via a storage medium because there is no mention of acquiring these in stage 1 (Fig. 2), so therefore they must be provided. Furthermore, an image display is disclosed inherently through the computer rendering which generates Figure 24 (col. 5 lines 56-58).

Regarding Claim 2: O'Donnell discloses a method as claimed in claim 1, in which the direction of the search line (n.sub.i) corresponds to the projection of a line perpendicular to the mesh onto the plane of the image. [The uncertainty line (Fig. 13, 36) represents the search line and is perpendicular to a line on the mesh (Fig. 13, 34) (col. 12 lines 56-58).]

Regarding Claim 3: O'Donnell discloses a method as claimed in claim 1, in which the search for a structure point is limited to a zone of the search line which

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is symmetrically situated relative to the line of intersection (h) of the mesh and the plane of the image. [The zone or search space (Fig. 13, 30) is defined by the grouping of search lines (Fig. 13, 36) that are centered on the line of intersection (Fig. 13, 34) of the mesh and the plane of the image (col. 12 lines 58-63). The centering of the search lines (Fig. 13, 36) on the line of intersection symmetrically situates the zone. The algorithm of stage 2 is therefore limited to searching the neighbors, which belong to the search space (30), for the final contour, which is a set of structure points.]

Regarding Claim 4: O'Donnell discloses a method as claimed in claim 1, in which the search lines extend through the centers of the lines of intersection of the meshes and the plane of the image. [Observation of search space (30) in Figure 13, indicates that the search lines (36) extend through all points on the lines of intersection (34), including the centers.]

Conclusion

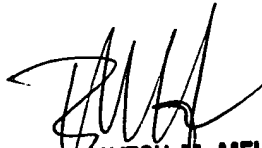
8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Craig W. Kronenthal whose telephone number is (571) 272-7422. The examiner can normally be reached on 8:00 am - 5:00 pm / Mon. - Fri..

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Bhavesh Mehta can be reached on (571) 272-7453. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

March 31, 2006
Craig W. Kronenthal


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